

# Commodity Market Monthly

Research Department, Commodities Unit



April 18, 2017<sup>1</sup>

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**Commodity prices fell by 3.8 percent in March 2017. (Figure 1.) This decrease in the IMF's commodity price index was largely driven by the 5.6 percent fall in the fuel index. The Food and Beverage Indices fell more modestly, by 2.8 and 1.9 percent respectively. The metal price index fell by 1.0 percent.**

Figure 1

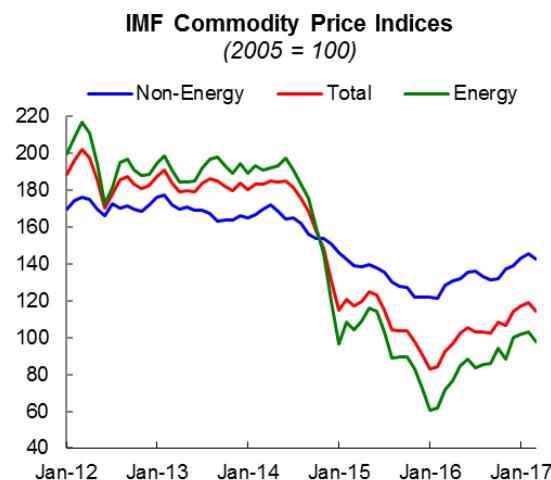
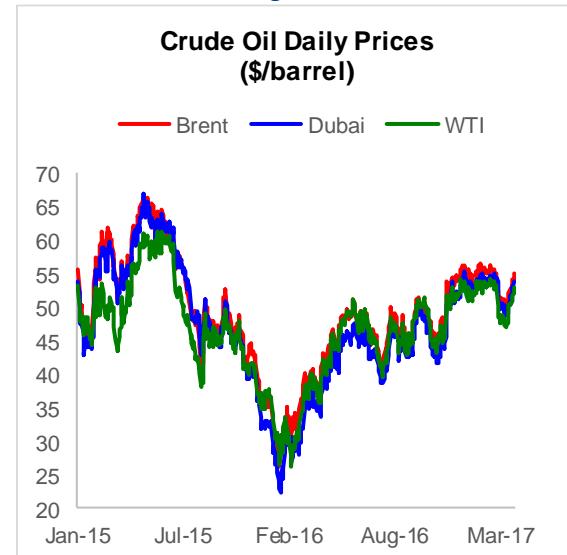


Figure 2



Oil prices declined sharply in the middle of March as the U.S. inventories accumulated more than expected. A few outages, the possible extension of OPEC production cut, and geopolitical tensions helped prices to rebound.

## Energy

Monthly average crude oil prices decreased 6.3 percent in March to \$50.91/bbl. During the month of March (from the end of February to the end of March), Average Petroleum Spot Price (simple average of U.K. Brent, Dubai Fateh, and West Texas Intermediate; APSP) decreased 5.7 percent. It has since rebounded to around \$54 as of mid-April.

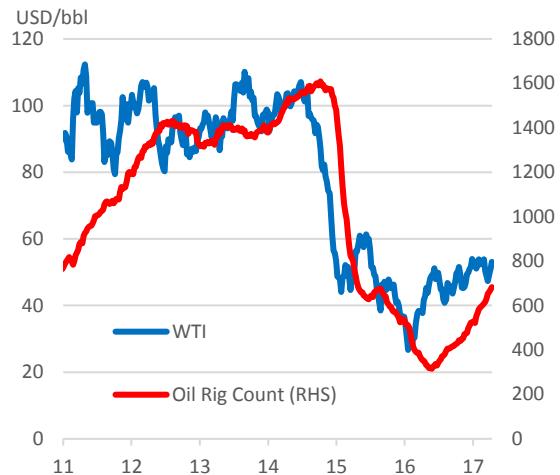
OPEC production in March declined partly because of Libya and Nigeria, both exempted from the quota, and partly because Saudi Arabia cut more than they had agreed. Nigeria's decline is due to scheduled maintenance but Libya lost production due to intensification of fighting. In March, OPEC's overall compliance rate exceeded 100 percent. That non-OPEC countries agreed to cut production with OPEC helps to explain this

<sup>1</sup> Fan charts are based on the closing price of April 12, 2017.

high compliance rate. Canada's production declined sharply due to fire at an oil sands plant.

The U.S. rig count increased so strongly that completion activity may not be able to keep up (Figure 3). This implies an increase of DUCs (drilled but uncompleted wells). IEA revised its production estimate upwards to 13 mbd in 2017.

**Figure 3**  
**Oil prices and rig counts in the U.S.**

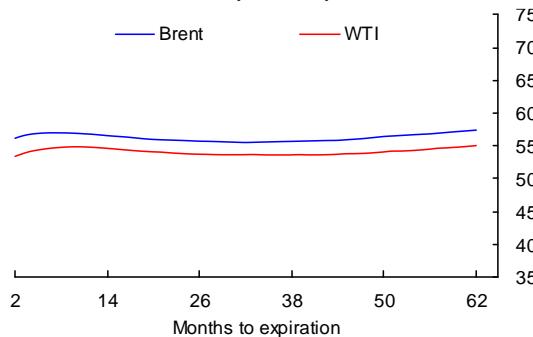


On the demand side, the International Energy Agency (IEA) has revised its global oil demand growth downwards to 1.3 mbd for 2017 as actual OECD demand was weak in the first quarter. Non-OECD demand was mixed as China's demand grew strongly while India's slowed.

OECD inventories decreased in February, following the buildup in January. This is partly because OPEC increased production and exported before January and floating inventories showed up at that time. Global inventories in the first quarter are expected to represent a minor buildup since weak demand in OECD will likely offset the OPEC production cut and a few outages.

Futures contracts point to oil prices (APSP) increasing gradually to \$54.41 in 2017 (compared to the current IMF baseline of \$55.23) and \$55.13 in 2018 (compared to current IMF baseline of \$55.06). Future curves are almost flat for the next 5 years. (Figure 4.)

**Figure 4**  
**Day's Oil Future Curves (\$/barrel)**



Average monthly natural gas prices in the U.S. increased by 1.9 percent to an average of \$2.87/MMBtu in March from an average of \$2.82/MMBtu in February. Daily prices increased 23.3 percent to \$3.10 at the end of March from \$2.52 at the end of February, due to unseasonably cold weather. In Europe, long-term contract prices (Russian Natural Gas border price in Germany) have decreased 1.2 percent to \$5.81/MMBtu. Spot NCG prices (converted to USD) have also declined by 7.9 percent in March. LNG spot prices in Asia have decreased in March, as the season of high demand is over.

Coal prices in Australia have increased by 0.3 percent in March due to a cyclone in Australia. The U.S. shows signs of revoking the Clean Power Plan but the impact on coal prices is probably limited as uncertainty regarding the future energy policy under the next administration would discourage the investment in coal power plants.

## Metals

### Base Metals

The IMF metal price index, comprising of 8 base metals (Table 1), fell a modest 1.0 percent in March 2017, month-on-month. After continuing to rise at the beginning of 2017, most metal prices declined: copper (-1.9%), nickel (-4.2%), zinc (-2.3%), lead (-1.3%), iron ore (-1.3%), and uranium (-1.4%). Aluminum and tin were the two exceptions, increasing by 2.1 and 2.0 percent, respectively.

**Table 1**  
**Current Base Metal Prices and % changes**  
**(as of March 31, 2017)**

Metal	Price (\$)	% change	
		Month-on-Month	Year-to-Date
Copper	5,816/MT	-1.9	5.3
Aluminum	1,952/MT	2.1	14.6
Tin	20,230/MT	2.0	-4.6
Nickel	9,963/MT	-4.2	0.0
Zinc	2,750/MT	-2.3	7.5
Lead	2,331/MT	-1.3	16.6
Iron Ore	81.0/MT	-1.3	1.3
Uranium	23.25/lb	-1.4	14.0

Sources: London Metal Exchange (Copper, aluminum, tin, nickel, zinc, and lead); DataStream CIF China United States (FE63.5%, iron ore); and New York Mercantile Exchange (uranium).

The price of iron ore fell 1.3 percent, month-on-month, increased 1.3 percent year-to-date, and stands at \$81/MT, its lowest point since February 6, 2017. The recent fall in prices can be attributed to Beijing raising interest rates for housing loans (for the third time in three months) to rein in the home loan growth and cool overheating property markets, adding concern that Chinese steel demand will fall this year (by an estimated 2%), putting further downward pressure on iron ore prices. This downward trend is expected to continue as inventories at 50 Chinese ports have

reached their highest point in more than a decade (134 million MT in late March). Some ports appear to be running low on storage capacity. Prices are projected to fall through 2018.

Copper prices fell 1.9 percent, month-on-month, and by 2.5 percent from the end of February to the end of March, to reach \$5,816/MT. The recent downturn in prices can be attributed to the end of the strikes at Escondida, Chile and Cerro Verde, Peru. The Escondida strike is estimated to have cost parent company BHP Billiton more than 200,000MT in copper production or 20% of its 2016 output. Conversely, workers at Southern Copper's Cuajone and Toquepala mines in Peru started an indefinite strike on Monday, April 10. These two mines produced about 310,000 MT of copper in 2016, compared to 502,600 MT produced by Cerro Verde. Grasberg will resume copper exports after Indonesia issued parent company Freeport a temporary mining license, valid for eight months. Future markets indicate roughly constant prices.

The price of nickel dropped 4.2 percent, month-on-month, and stands at \$9,963/MT returning to where it began the year. Eight miners in the Philippines, which had previously been ordered to suspend operations for environmental reasons, have recently been granted permission to export nickel ore. These shipments are estimated to be between 1 and 5 million MT. LME nickel stocks have been increasing, by about 10,000 MT year-to-date. Prices are projected to remain constant.

Aluminum prices increased 2.1 percent, month-on-month, and 14.6 percent year-to-date. Prices hit \$1,962 on March 30, a 22-month high amid tightening supplies. LME aluminum stocks fell to 1.73 million MT, their lowest since December 2008. Fueling the acceleration in aluminum's price is China's crackdown on its polluting smelters. Since January, when China's pollution problems worsened, the government announced that it

would enforce a shutdown of about a third of its aluminum capacity between mid-November and mid-March, threatening 1.3 million MT of aluminum production. In addition, rising coking coal prices have increased the cost of aluminum production in China.

### Precious Metals

Precious metals have seen their prices fall in March, month-on-month. Platinum prices fell 4.4 percent, silver fell 1.8 percent, and gold was more stable, falling 0.4 percent. Palladium's average price was unchanged between February and March, but increased 2.8 percent from the end of February to the end of March. Year-to-date price changes for all precious metals are positive.

The US Federal Reserve raised the short-term interest rate from 0.75 percent to 1 percent on March 15. Following the announcement, the price of gold rallied, increasing 3.8 percent between March 15 and 31 as the Fed indicated a dovish tone. In April, geopolitical tensions (Syria and North Korea) put upward pressure on precious metals.

**Table 2**  
**Current Precious Metal Prices and % changes**  
**(as of March 31, 2017)**

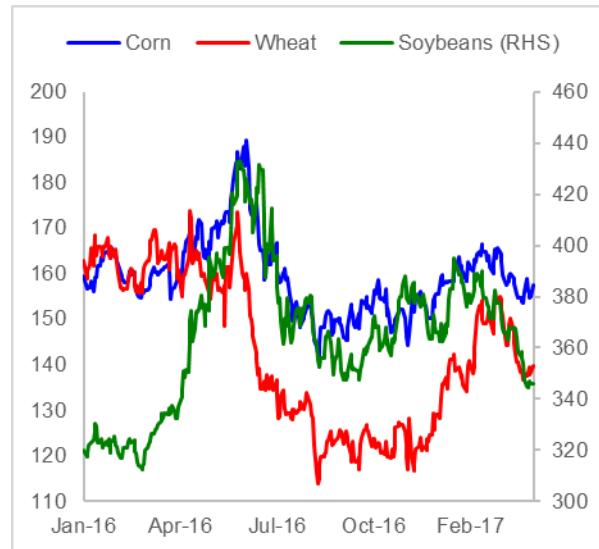
Metal	Price (\$)	% change	
		Month-on-Month	Year-to-Date
Gold	1,245/toz	-0.4	8.6
Silver	18.1/toz	-1.8	11.2
Platinum	940/oz	-4.4	4.7
Palladium	798/oz	0.0	19.1

Sources: ICE Benchmark Administration (gold), London Bullion Metal Association (silver), and London Metal Exchange (platinum and palladium).

### Agriculture

The IMF's price index of food, beverages and agricultural raw materials decreased by 2.1 percent in March 2017. While the index of food and beverages recorded a substantial loss of 2.7 percent, the index of agricultural raw materials decreased only by 0.2 percent. The decline in the food and beverages index comes on account of major losses for the indices of sugar and seafood, falling by 9.7 and 7.4 percent, respectively, and more modest losses for vegetable oils, beverages and cereals, which lost 3.5, 1.9, and 1.1 percent, respectively. Meats are the only major food group that gained in March 2017, with a 2.6 percent price increase. As for individual commodities, we highlight the substantial losses for free market sugar (-11.2%), palm oil (-6.2%), pork (-4.7%), and soybeans (-3.9%) in particular.

**Figure 5**  
**Corn, Wheat, and Soybean Prices**  
**(\$/MT)**



Sources: United States Department of Agriculture (corn, wheat), Chicago Board of Trade (soybeans)

The reduction in agricultural prices can be partly understood in terms of a shift of sentiment. From February 14, 2017 onwards, hedge funds have

been reducing their net long position in futures and options in the top 13 US-traded agricultural commodities for seven consecutive weeks. This recent reversal, from a net bullish bet to a net bearish one, means that hedge funds are now roughly holding the same position as in June 2015. Hedge funds' current stance seems to be more in line with the fundamentals, as supply is still ample in many markets. For example, on April 11, 2017 the United States Department of Agriculture (USDA) upgraded its forecast of 2016-2017 global ending stock of all grains to 628.4 million metric ton (mmt), up from 622.6 mmt. The selling, and resulting fall in agricultural prices, also coincides with the reduced prospects of inflationary pressures amid increased skepticism that US President Donald Trump would introduce economic stimulus measures, which would have increased commodity prices.

Annual food prices are expected to increase by 3 percent in 2017 year-on-year, mostly reflecting the relatively low level of prices that prevailed in agricultural markets in 2016H1. Recent upgrades to the forecasts for production of wheat, corn, and soybeans by the USDA may put downward pressure on prices for the remainder of this year. Downside risks to the price outlook remain unchanged and include (i) increased agricultural supplies from China and (ii) greater overall economic uncertainty. The US weather service now notes there are increasing odds for El Niño toward the second half of 2017 (50-55% chance from approximately July-December 2017), adding upside risk to the outlook.

The price of palm oil decreased by 6.2 percent, month-on-month, in March 2017, reaching a low not seen since August 2016. The downward pressure on prices comes from a faster-than-expected recovery of output, after last year's El Niño induced crunch. Malaysian palm oil

production was up by 20 percent year-on-year in March 2017. In addition, Malaysian inventories grew faster than expected as well, to 1.55 million tons, as data from the Malaysian Palm Oil Board released on April 10, 2017, even though exports increased by 14 percent month-on-month in March 2017.

In March 2017, free market prices of sugar decreased by 11.2 percent, month-on-month. Prospects for the upcoming harvest season in Brazil, which starts in April, are strong as weather has been good. In addition, observers expect that sugar cane mills in Brazil will continue to favor the production of sugar at the expense of ethanol production, even more so than last season, as sugar prices continue to be relatively high. Data from the Commodity Futures Trading Commission (CFTC) show that managed money, a proxy for speculators, reduced their net long in sugar throughout March.

Prices of soybeans decreased by 3.9 percent in March 2017. Rabobank argues that the drop coincides with the fall in crude oil prices, with hedge funds reducing their net long positions in commodities. On the soybean supply side, most news have been bearish. On March 9, 2017, the USDA upgraded its 2016-2017 soybean forecast for top producer Brazil by 4 percent. On April 10, 2017, the USDA upgraded its forecast of Brazilian output once more, and upgraded its 2016/2017 global ending stock forecast by 5.6 percent to 87.4 mmt, exceeding expectations of most analysts. Finally, sowings of soybean in the United States are expected to increase to 86.4 million acres, somewhat below expectations, thereby providing some bullish news.

Like its rival soybean, prices of corn decreased in March 2017, down by 2.4 percent from February 2017, on account of large recent crops in Latin

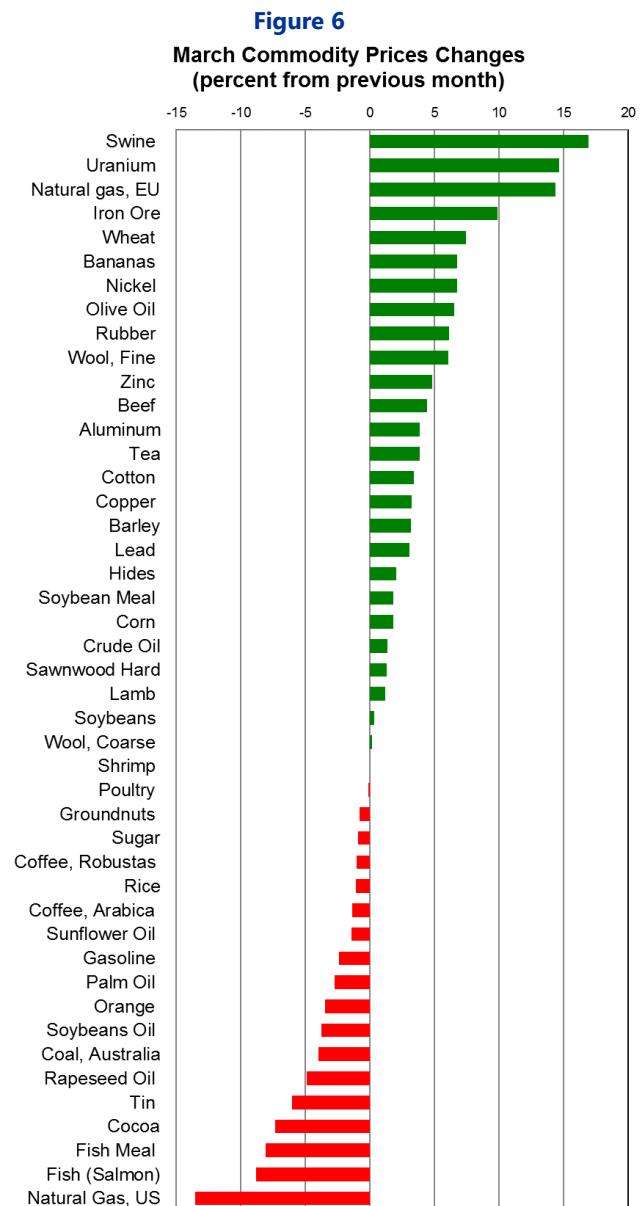
America. In addition, while stock forecasts looked somewhat bullish back in January, good weather in Latin America now underpins more bearish forecasts. On March 9, 2017, the USDA upgraded its forecast of Brazil's 2017 corn harvest by 6 percent. Similarly, on April 11, 2017 the USDA upgraded it again. Global ending stocks for 2016-217 were increased to 223 mmt, up from 220.7 mmt, mostly because of upgrades to production in Argentina, Brazil and South Africa. Incentives for farmers to shift towards soybean production have increased, which should support market rebalancing next year.

Lean hog prices in the U.S. decreased by 4.7 percent month-on-month in March 2017, thereby interrupting the price rally that started in December 2016. Total supply to U.S. slaughterhouses has been somewhat stronger than expected, with this year's figure running 4 percent higher compared to last year. In the next few months, new hog processing plants are expected to come on line in the US, which should put downward pressure on prices. Due to the slow recovery of the Chinese sow herd it will be some time before global production levels for pork, which peaked in 2014, recovers. Local prices in the US, the EU and Latin America will continue to be influenced by countries' access to the large Chinese market. Demand from China will be especially important for US hog prices in Q2 and Q3 of this year. A seasonal increase in US demand should also provide price support.

The price of beef increased by 3 percent in March 2017. The gain is mostly temporary, as prices profited from a temporary import ban on Brazilian beef, motivated by food safety concerns, by China and other major importers.

The price of coffee Arabica decreased by 3.7 percent in March 2017. As explained before, this

should be understood in the context of speculators' waning interest in agricultural commodities. In addition, a strong Brazilian Arabica crop for the 2017-2018 now seems increasingly likely, as growing conditions in Brazil look promising. The market is balancing the existing tightness of supplies, as indicated by the global stock-to-use ratio which is below the 10-year average, and expectations of stronger supplies.



**Table 1. Market Prices for Non-Fuel and Fuel Commodities**

	Units	2014	2015	2016	2016Q1	2016Q2	2016Q3	2016Q4	Feb-17	Mar-17
<b>Food</b>										
Cereals										
Wheat	\$/MT	242.5	185.6	143.2	162.6	159.2	128.2	122.6	147.3	146.4
Maize	\$/MT	192.9	169.8	159.2	159.9	171.1	153.4	152.2	162.9	159.0
Rice	\$/MT	426.5	380.0	388.3	367.7	401.8	418.2	365.3	368.5	367.8
Barley	\$/MT	146.1	127.9	129.4	119.7	137.4	131.1	129.3	136.2	137.3
Vegetable oils and protein meals										
Soybeans	\$/MT	457.8	347.4	362.7	323.4	387.8	372.2	367.3	380.9	366.1
Soybean meal	\$/MT	467.0	352.7	350.2	294.9	392.9	370.0	342.9	371.4	356.9
Soybean oil	\$/MT	812.7	672.2	721.2	686.9	719.7	701.4	776.6	742.9	723.4
Palm oil	\$/MT	739.4	565.1	639.8	586.9	647.8	647.0	677.7	706.8	663.3
Fish meal	\$/MT	1921.5	1759.2	1418.5	1466.4	1511.5	1409.7	1286.2	1125.5	1069.0
Sunflower Oil	\$/MT	1080.3	1022.2	1009.7	1024.5	1028.6	982.0	1003.7	967.0	936.8
Olive oil	\$/MT	3780.6	4292.8	3978.5	4085.7	3897.5	3982.3	3948.3	4424.2	4434.1
Groundnuts	\$/MT	2148.3	1946.2	1798.3	1821.3	1855.4	1804.7	1711.8	1806.4	1882.1
Rapeseed oil	\$/MT	904.4	774.6	822.0	774.7	797.7	810.6	904.7	872.3	839.9
Meat										
Beef	cts/lb	224.1	200.5	178.2	168.9	179.3	185.4	179.3	184.6	190.2
Lamb	cts/lb	130.6	107.9	106.9	95.5	100.6	110.8	120.8	123.7	128.3
Swine Meat	cts/lb	102.8	67.9	62.4	60.3	72.6	66.6	50.1	71.8	68.4
Poultry	cts/lb	110.1	114.7	111.5	112.1	111.8	110.9	111.1	114.4	124.0
Seafood										
Fish	\$/kg	6.6	5.3	7.1	6.5	7.3	7.2	7.5	7.9	7.2
Shrimp	\$/kg	16.6	14.1	11.0	11.0	10.6	10.7	11.8	12.1	12.1
Sugar										
Free market	cts/lb	17.1	13.2	18.5	14.8	17.6	20.8	20.9	20.3	18.1
United States	cts/lb	24.9	24.8	27.0	25.6	26.4	27.2	28.9	30.4	29.8
EU	cts/lb	27.4	25.4	22.5	23.8	23.9	21.8	20.7	20.8	20.5
Bananas	\$/MT	931.9	958.7	1002.4	1028.2	993.0	1023.2	965.4	1040.1	1071.6
Oranges	\$/MT	782.5	675.0	889.1	686.2	784.7	992.5	1093.1	902.6	921.3
<b>Beverages</b>										
Coffee										
Other milds	cts/lb	202.8	160.5	164.5	150.7	158.5	173.6	175.3	165.6	159.4
Robusta	cts/lb	105.6	94.2	94.3	82.1	90.4	98.5	106.1	110.1	110.0
Cocoa Beans	\$/MT	3062.8	3135.2	2892.0	2980.8	3099.9	2987.9	2499.6	2034.1	2063.1
Tea	cts/kg	237.9	340.4	287.4	290.3	251.4	284.7	323.4	382.9	356.1
<b>Agricultural raw materials</b>										
Timber										
Hardwood										
Logs 1/	\$/M3	282.0	246.0	274.4	258.2	275.7	290.7	272.8	263.5	263.5
Sawnwood 1/	\$/M3	897.9	833.3	738.9	780.3	782.3	716.2	676.8	680.5	672.5
Softwood										
Logs 1/	\$/M3	174.3	162.0	156.8	168.4	143.5	151.7	163.7	157.6	157.6
Sawnwood 1/	\$/M3	307.3	308.7	297.1	267.2	309.2	307.6	304.7	287.4	287.4
Cotton	cts/lb	83.1	70.4	74.2	66.9	71.2	79.7	79.0	85.2	86.8
Wool										
Fine	cts/kg	1074.4	1005.8	1112.0	1023.4	1092.8	1140.3	1191.4	1368.1	1454.8
Coarse	cts/kg	1034.6	927.8	1016.4	959.1	1009.0	1082.2	1015.1	1029.6	1059.6
Rubber	cts/lb	88.8	70.7	74.5	59.3	75.2	76.1	87.3	123.0	107.4
Hides	cts/lb	110.2	87.7	74.1	72.8	73.5	74.2	75.9	76.6	77.9

1/ Provisional.

2/ Average Petroleum Spot Price (APSP). Average of U.K. Brent, Dubai, and West Texas Intermediate, equally weighted.

**Table 1. Market Prices for Non-Fuel and Fuel Commodities (Continued)**

	Units	2014	2015	2016	2016Q1	2016Q2	2016Q3	2016Q4	Feb-17	Mar-17
<b>Metals</b>										
Copper	\$/MT	6863.4	5510.5	4867.9	4674.7	4736.4	4779.6	5280.8	5940.9	5824.6
Aluminum	\$/MT	1867.4	1664.7	1604.2	1514.5	1571.8	1620.2	1710.3	1860.8	1901.5
Iron Ore	\$/MT	97.4	56.1	58.6	48.4	56.4	58.6	70.8	88.8	87.2
Tin	\$/MT	21898.9	16066.6	17933.8	15438.6	16902.1	18584.3	20810.1	19446.5	19875.2
Nickel	\$/MT	16893.4	11862.6	9595.2	8507.7	8822.5	10263.5	10787.0	10643.3	10204.7
Zinc	\$/MT	2161.0	1931.7	2090.0	1677.3	1916.9	2251.6	2514.2	2845.6	2776.9
Lead	\$/MT	2095.5	1787.8	1866.7	1738.0	1717.6	1872.7	2138.3	2311.5	2280.9
Uranium	\$/lb	33.5	36.8	26.3	32.6	27.5	25.5	19.6	25.3	24.6
<b>Energy</b>										
Spot Crude 2/	\$/bbl	96.2	50.8	42.8	32.8	44.8	44.7	49.1	54.4	50.9
U.K. Brent	\$/bbl	98.9	52.4	44.0	34.4	46.0	45.8	50.1	55.5	52.0
Dubai	\$/bbl	96.7	51.2	41.2	30.7	42.9	43.4	47.9	54.2	51.2
West Texas Intermediate	\$/bbl	93.1	48.7	43.2	33.3	45.5	44.9	49.2	53.4	49.6
Natural Gas										
Russian in Germany	\$/mmbtu	10.5	7.3	4.4	4.7	4.0	4.2	4.6	5.9	5.8
Indonesian in Japan (LNG)	\$/mmbtu	17.0	11.0	7.4	8.2	6.9	7.4	7.4	8.0	7.8
US, domestic market	\$/mmbtu	4.4	2.6	2.5	2.0	2.1	2.8	3.0	2.8	2.9
Coal										
Australian, export markets	\$/MT	75.1	61.6	70.6	54.5	55.6	72.3	99.8	86.2	86.4

1/ Provisional.

2/ Average Petroleum Spot Price (APSP). Average of U.K. Brent, Dubai, and West Texas Intermediate, equally weighted.

**Table 2. Indices of Market Prices for Non-Fuel and Fuel Commodities, 2014-2016**

(2005=100, in terms of U.S. dollars) 1/

	(weights) 1/	2014	2015	2016	2016Q1	2016Q2	2016Q3	2016Q4	Feb-17	Mar-17
<b>All Primary Commodities 2/</b>	100.0	171.9	111.2	100.1	86.5	101.4	102.7	109.7	118.7	114.2
<b>Non-Fuel Commodities</b>	36.9	162.3	134.0	131.5	123.8	132.8	133.4	135.9	145.2	142.7
<b>Agriculture</b>	26.2	161.5	136.9	136.3	129.4	139.8	138.6	137.1	143.0	140.0
Food	16.7	170.1	140.8	143.8	136.3	149.2	145.9	143.9	151.8	147.6
Cereals	3.6	180.2	149.0	131.4	136.5	142.0	126.4	120.6	133.3	131.8
Vegetable oils and protein meals	4.4	190.5	152.8	155.9	143.1	163.8	158.6	158.0	162.7	157.0
Meat	3.7	160.5	137.4	126.6	122.3	131.4	130.9	121.9	134.6	138.1
Seafood	3.2	162.0	131.7	161.6	149.1	164.8	163.0	169.5	178.2	165.0
Beverages	1.8	178.0	172.6	163.9	158.7	163.5	169.8	163.8	155.7	152.8
Agricultural raw materials 3/	7.7	138.8	120.1	113.3	107.6	113.7	115.5	116.3	120.7	120.4
Timber	3.4	109.3	104.5	100.2	96.7	103.0	101.6	99.4	95.9	95.6
<b>Metals</b>	10.7	164.4	126.6	119.7	109.9	115.6	120.6	132.9	150.9	149.4
<b>Edibles 4/</b>	18.5	170.9	143.9	145.8	138.5	150.6	148.2	145.8	152.2	148.1
<b>Industrial Inputs 5/</b>	18.4	153.7	123.9	117.0	108.9	114.8	118.5	125.9	138.2	137.3
<b>Energy 6/</b>	63.1	177.4	97.9	81.7	64.7	83.0	84.8	94.3	103.2	97.4
Petroleum 7/	53.6	181.1	95.6	80.4	61.5	84.1	84.0	92.2	102.2	95.8
Natural Gas	6.9	159.9	106.8	70.0	73.5	64.1	69.3	73.1	85.0	83.7
Coal	2.6	149.1	121.3	138.4	107.8	110.8	141.7	193.3	170.5	167.7

1/ Weights based on 2002-2004 average world export earnings.

2/ Non-Fuel Primary Commodities and Energy Index.

3/ Includes Forestry Products.

4/ Edibles comprised of Food and Beverages

5/ Industrial (Non-Fuel) Inputs comprised of Agriculture and Metals

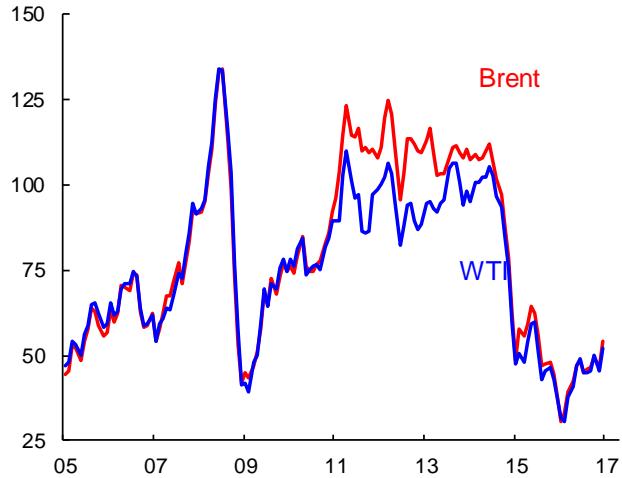
6/ Includes Petroleum, Natural Gas and Coal

7/ Average Petroleum Spot Price (APSP). Average of U.K. Brent, Dubai, and West Texas Intermediate, equally weighted.

## Commodity Prices Movements

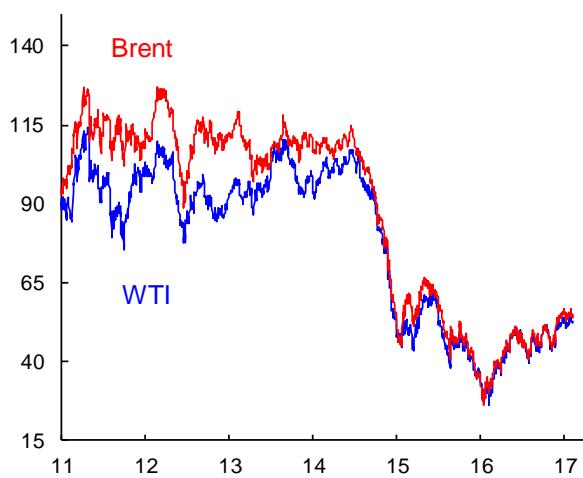
### Monthly (from 2005)

#### Crude oil (\$/bbl)

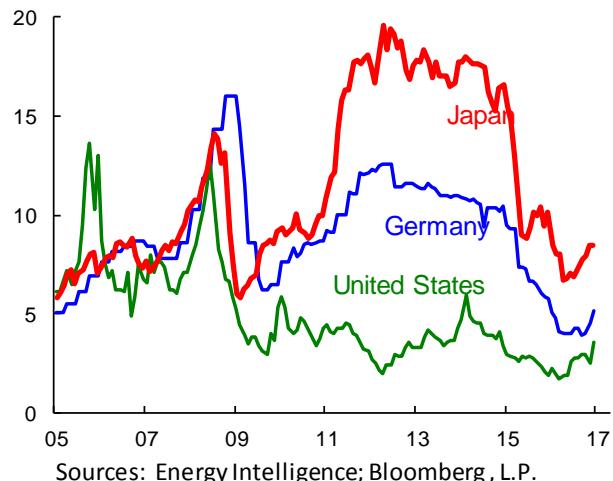


### Daily (from 2011)

#### Crude oil (\$/bbl)

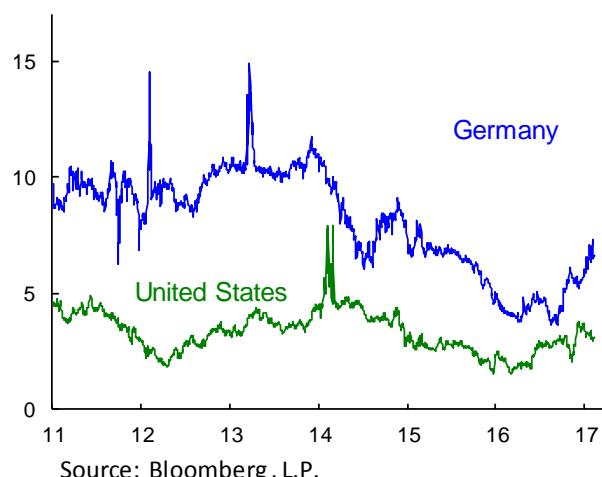


#### Natural Gas (\$/mmbtu)



Sources: Energy Intelligence; Bloomberg, L.P.

#### Natural Gas (\$/mmbtu)



Source: Bloomberg, L.P.

#### Iron Ore (\$/ton)

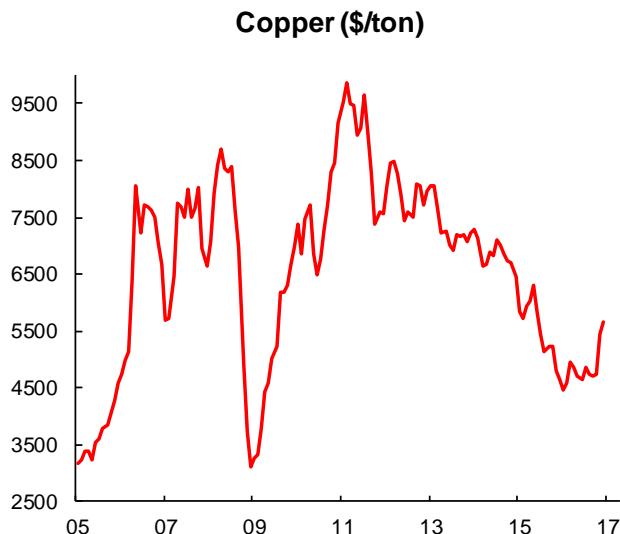


#### Iron Ore (\$/ton)



## Commodity Prices Movements (Continued)

**Monthly (from 2005)**



**Daily (from 2011)**



**Aluminium (\$/ton)**



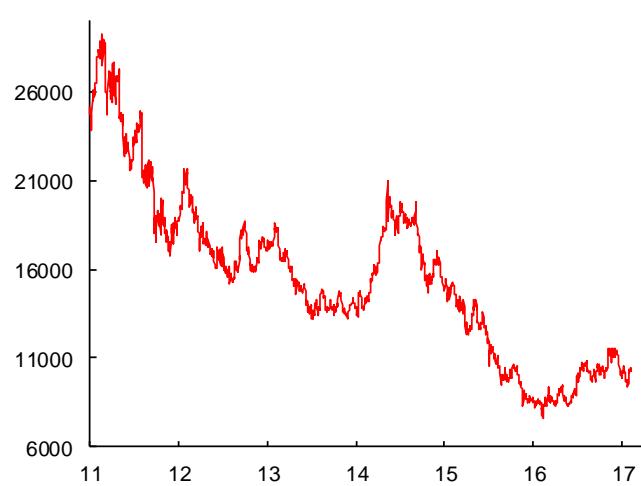
**Aluminium (\$/ton)**



**Nickel (\$/ton)**

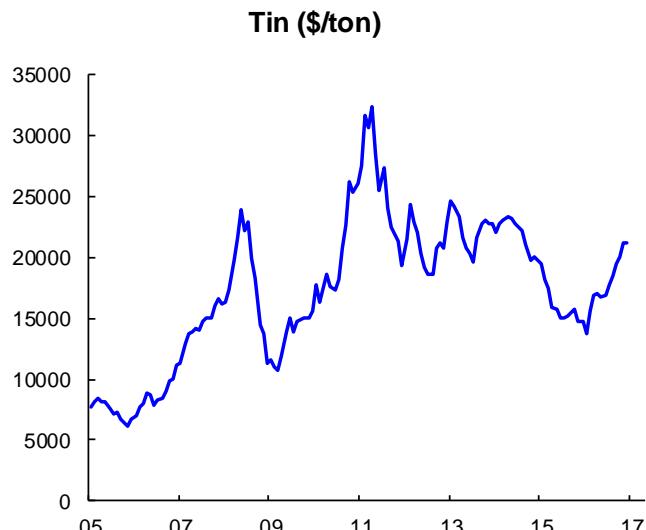


**Nickel (\$/ton)**

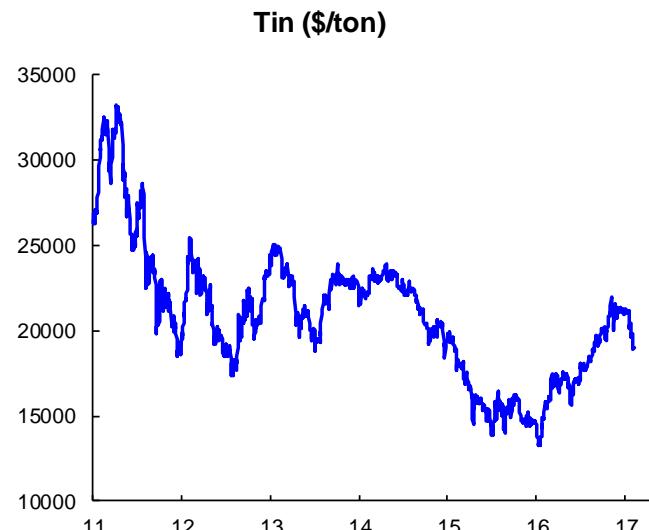


## Commodity Prices Movements (Continued)

**Monthly (from 2005)**



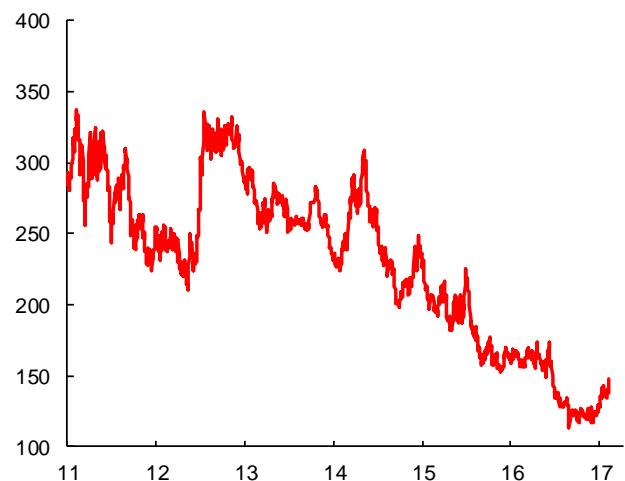
**Daily (from 2011)**



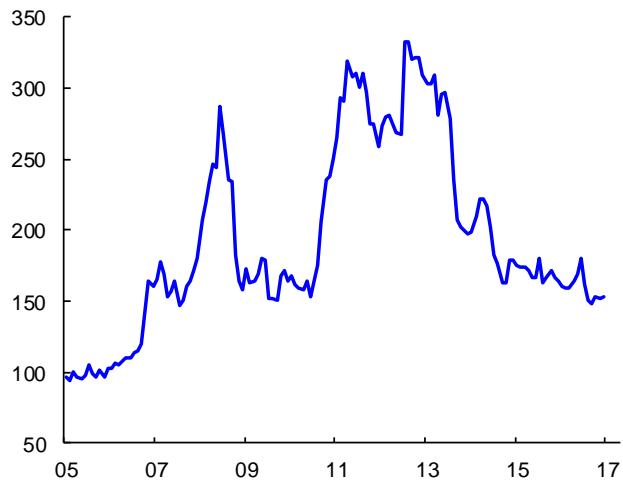
**Wheat (\$/ton)**



**Wheat (\$/ton)**



**Corn (\$/ton)**



**Corn (\$/ton)**



## Commodity Prices Movements (Continued)

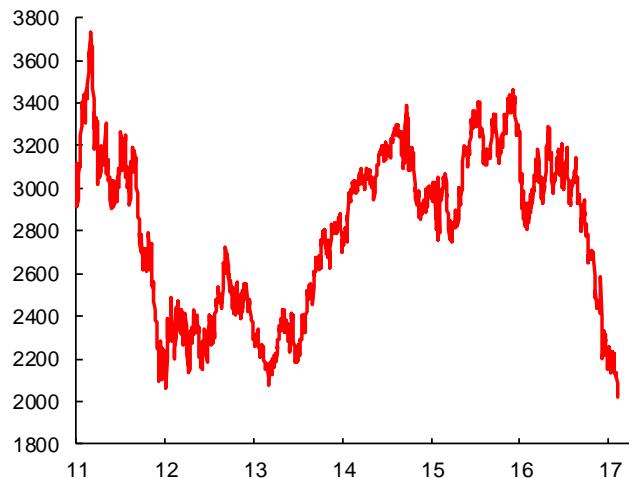
**Monthly (from 2005)**

**Cocoa (\$/ton)**



**Daily (from 2011)**

**Cocoa (\$/ton)**



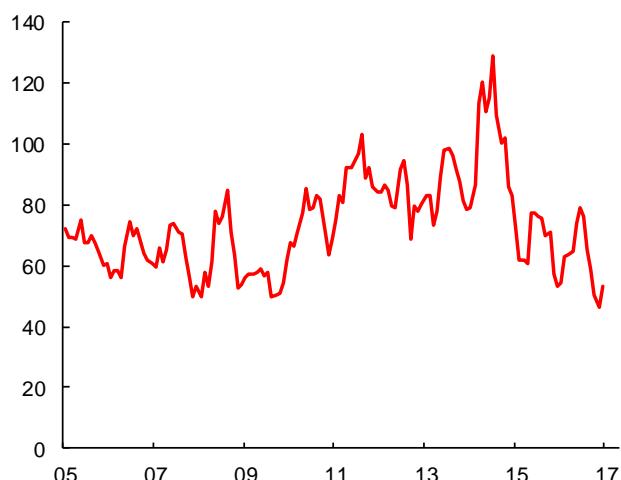
**Coffee (cents/lb)**



**Coffee (cents/lb)**



**Swine (cents/lb)**

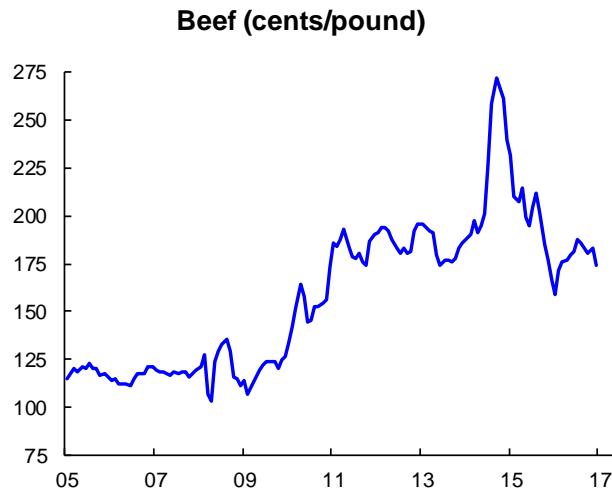


**Swine (cents/lb)**

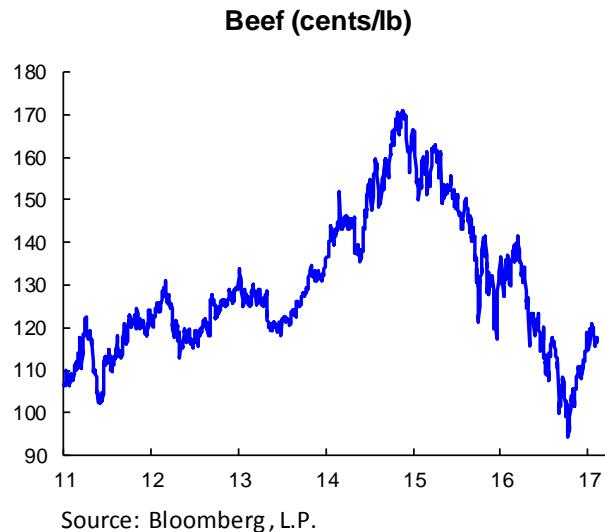


## Commodity Prices Movements (Continued)

**Monthly (from 2005)**



**Daily (from 2011)**



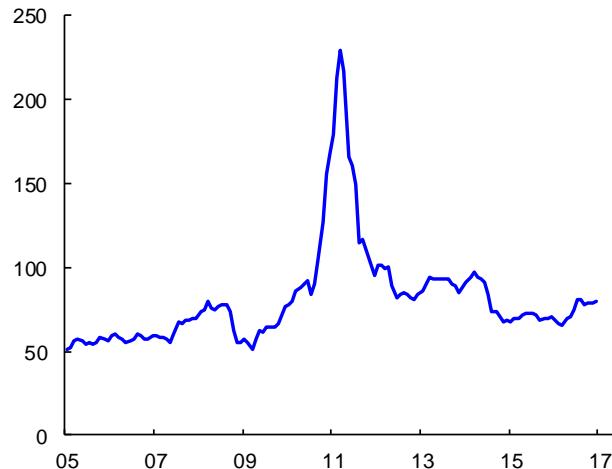
**Soybeans (\$/ton)**



**Soybeans (\$/ton)**



**Cotton (cents/pound)**



**Cotton (cents/lb)**



**Commodity Prices Movements (Continued)**  
**Monthly (from 2005)**

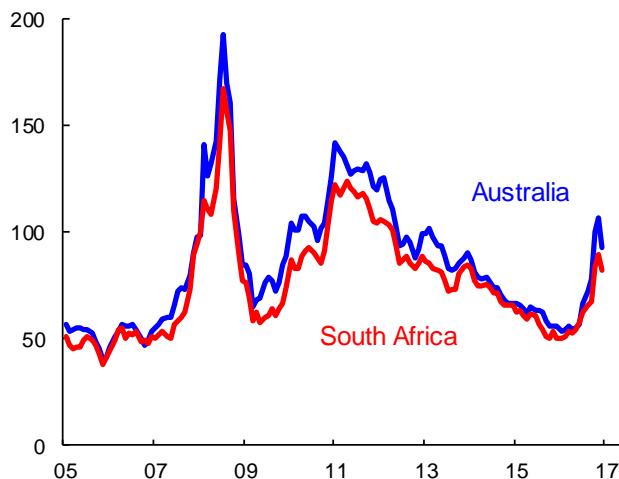
**Uranium(\$/lb)**



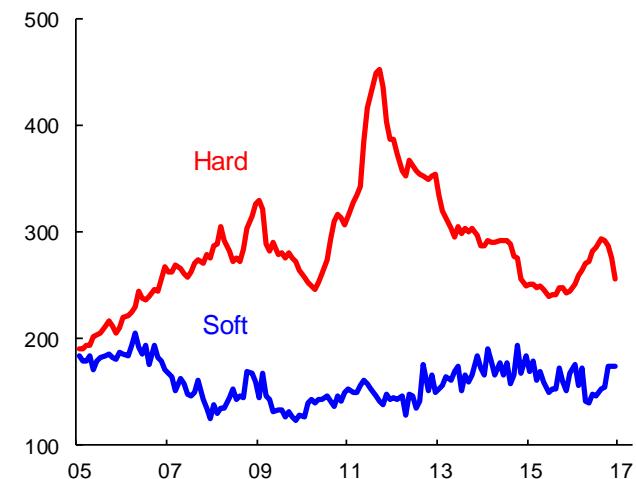
**Zinc (\$/ton)**



**Coal (\$/ton)**



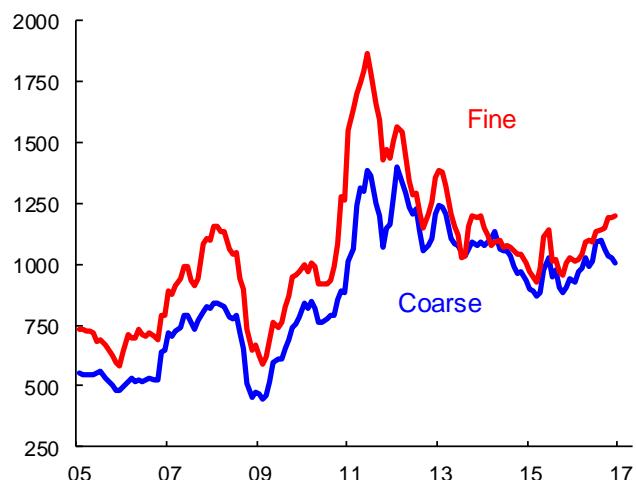
**Logs (\$/cubic meter)**



**Rubber (\$/lb)**

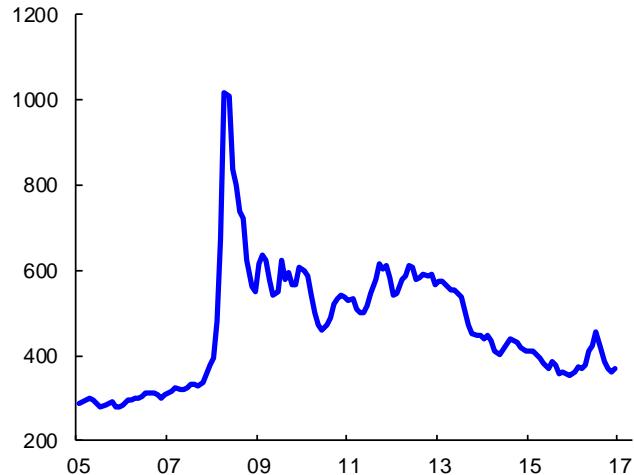


**Wool (cents/kg)**

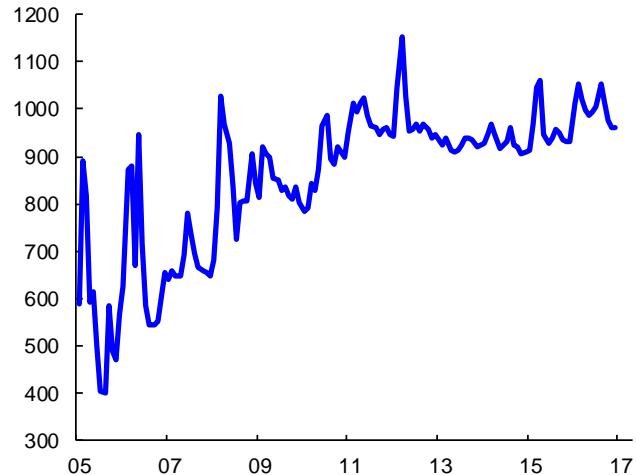


**Commodity Prices Movements (Continued)**  
**Monthly (from 2005)**

**Rice (\$/ton)**



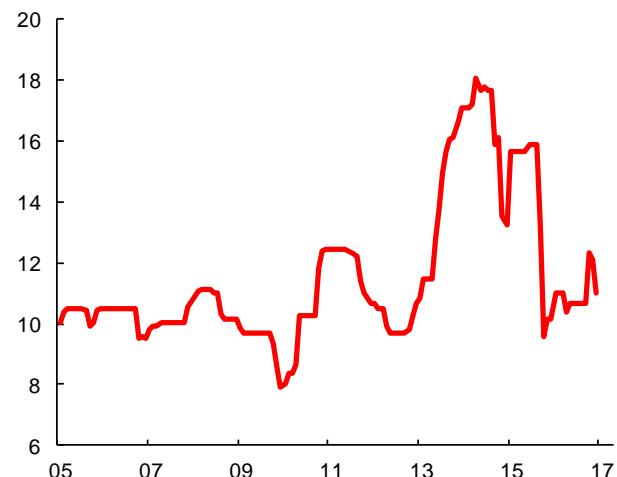
**Bananas (\$/ton)**



**Palm Oil (\$/ton)**



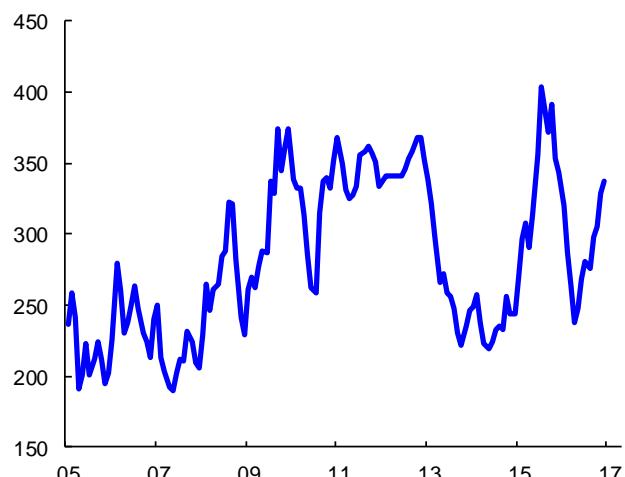
**Shrimp (\$/kg)**



**Sugar (cents/pound)**



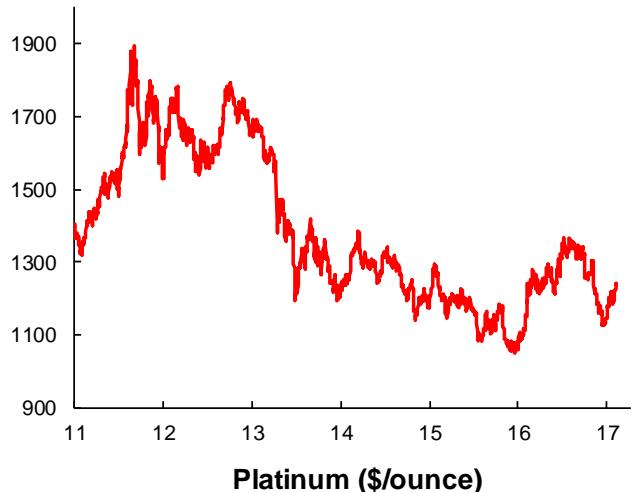
**Tea (cents/kg)**



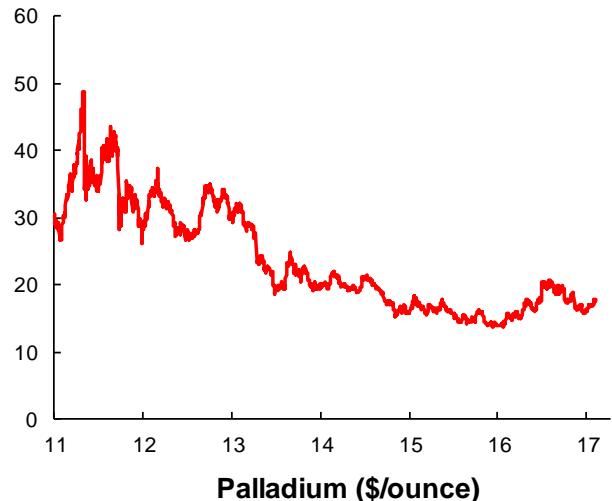
## Commodity Prices Movements (Continued)

Daily (from 2011)

Gold (\$/troy ounce)



Silver (\$/troy ounce)



Platinum (\$/ounce)



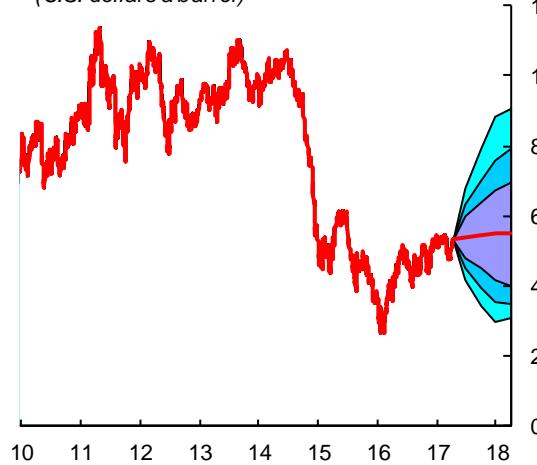
Palladium (\$/ounce)



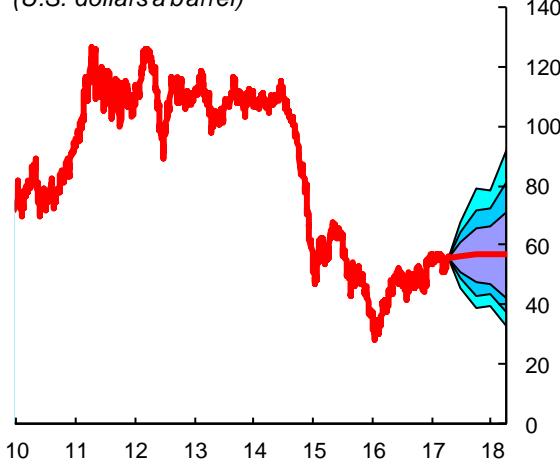
## Selected Commodities—Market Price Outlook and Risks

■ 95% confidence interval ■ 86% confidence interval ■ 68% confidence interval ■ Futures

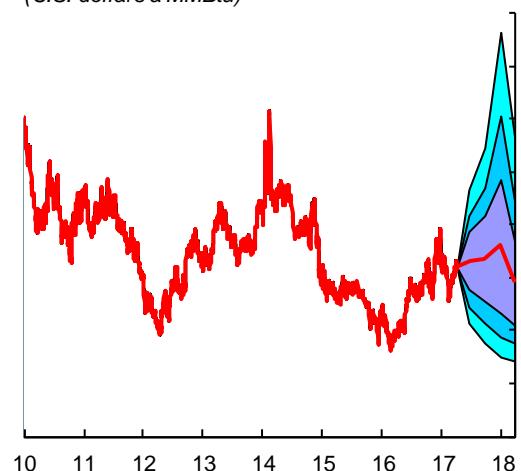
**WTI Crude Oil**  
(U.S. dollars a barrel)



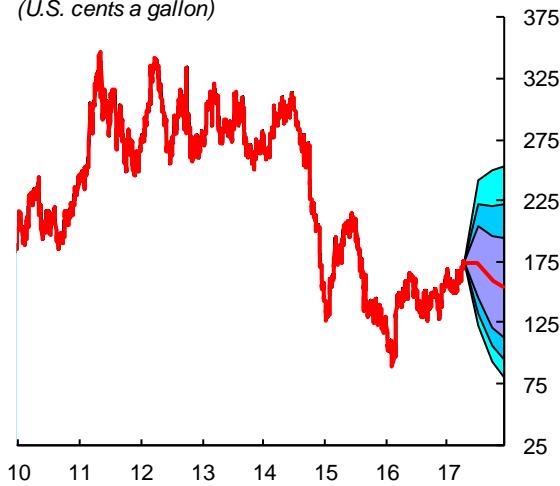
**Brent Crude Oil**  
(U.S. dollars a barrel)



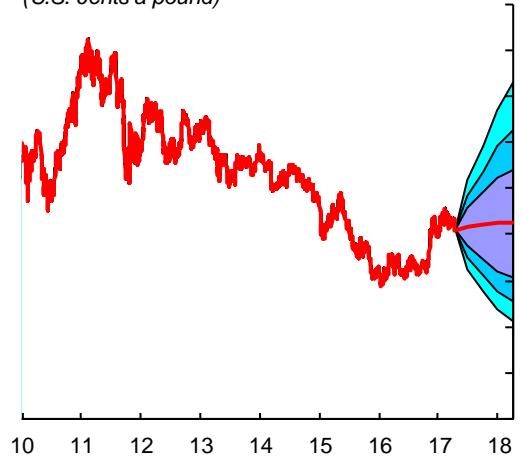
**Natural Gas**  
(U.S. dollars a MMBtu)



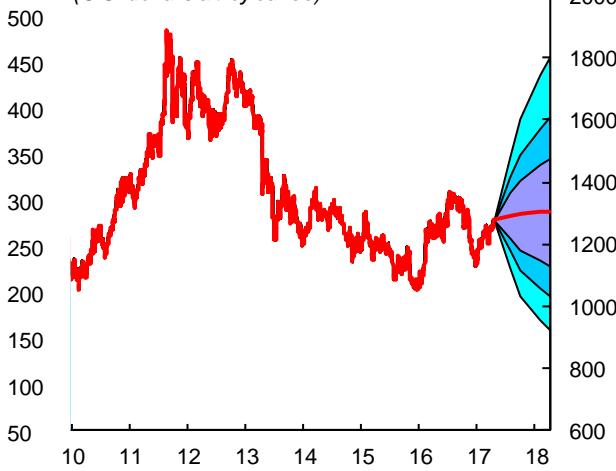
**Gasoline**  
(U.S. cents a gallon)



**Copper**  
(U.S. cents a pound)

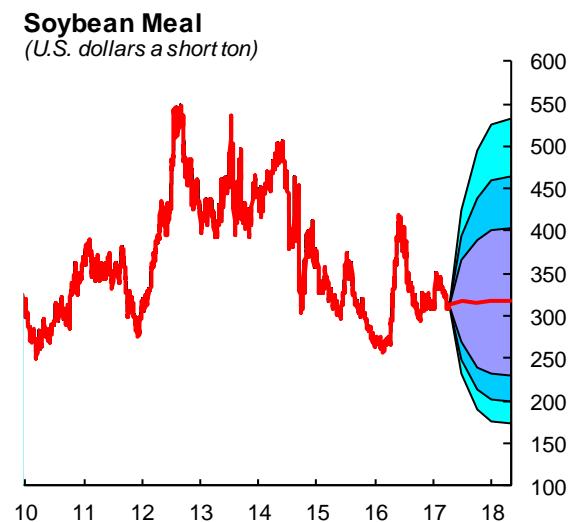
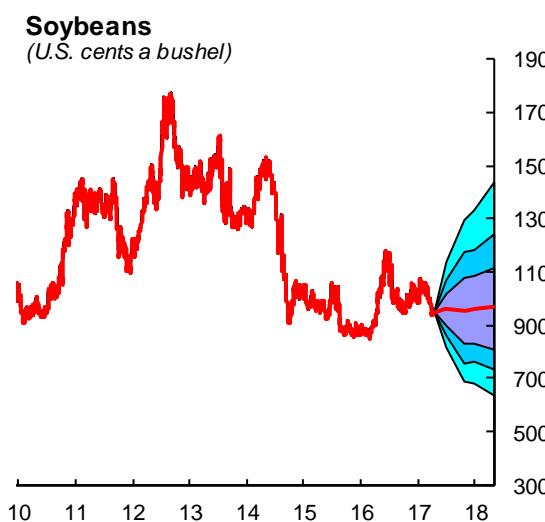
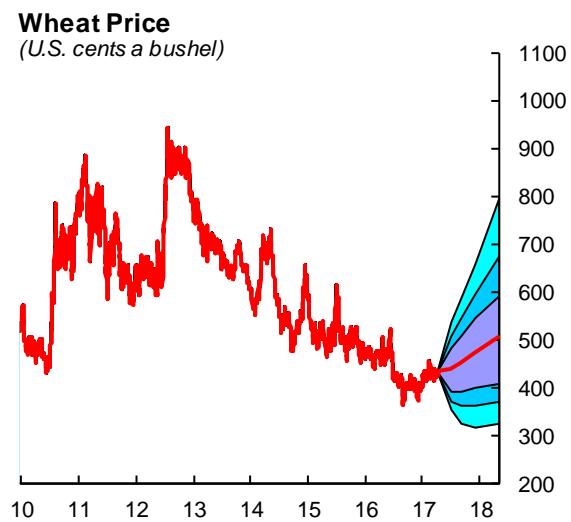
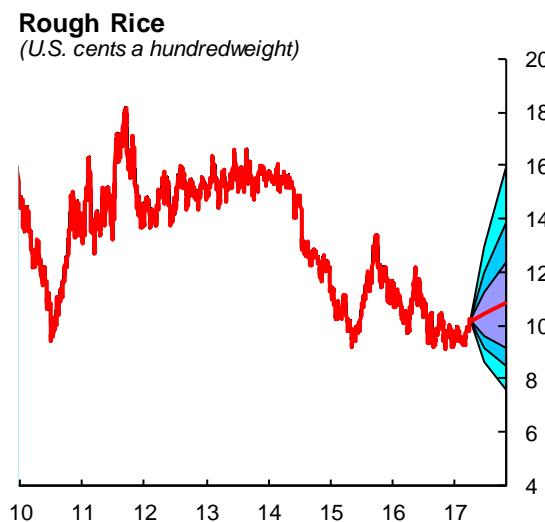
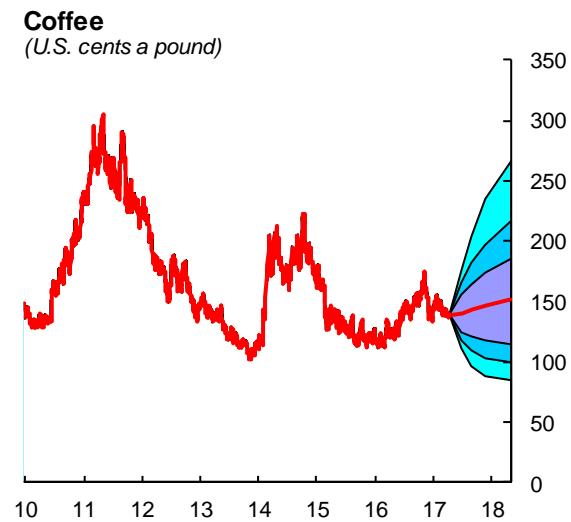
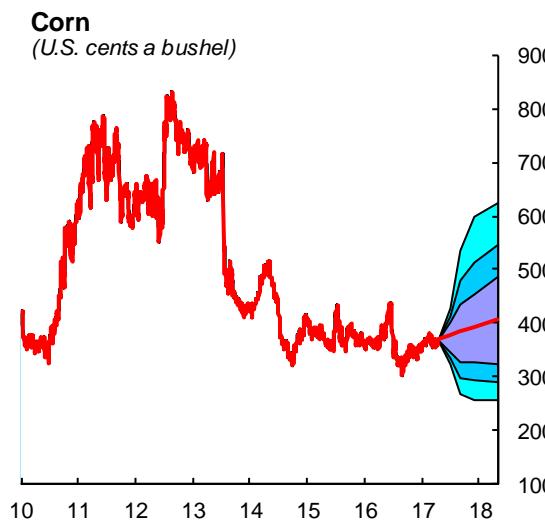


**Gold**  
(U.S. dollars a troy ounce)



## Selected Commodities—Market Price Outlook and Risks (concluded)

■ 95% confidence interval   ■ 86% confidence interval   ■ 68% confidence interval   ■ Futures



## Options-based Price Thresholds

### WTI Crude Oil

*(probabilities in percent; prices in U.S. dollars a barrel)*

Threshold Prices	Months Forward			
	3	6	9	12
< 25	0.0	0.1	0.4	0.2
< 30	0.0	0.8	2.2	2.0
< 35	0.1	3.3	6.8	7.6
< 40	1.4	8.7	14.9	18.8
< 45	8.8	19.2	27.4	34.4
< 50	30.1	38.1	44.7	51.2
< 55	63.7	61.9	63.1	66.3
> 60	12.1	19.0	21.7	21.8
> 65	3.2	8.4	11.8	13.4
> 70	0.8	3.8	6.2	7.9
> 75	0.2	1.8	3.3	4.5

### Brent Crude Oil

*(probabilities in percent; prices in U.S. dollars a barrel)*

Threshold Prices	Months Forward			
	3	6	9	12
< 30	0.0	0.1	0.0	0.9
< 35	0.0	0.7	0.3	4.3
< 40	0.1	3.8	3.0	12.6
< 45	2.0	11.9	12.3	26.1
< 50	12.7	27.6	30.4	42.6
< 55	43.9	50.0	52.8	58.8
< 60	80.8	72.0	72.8	72.6
> 65	4.4	13.2	13.7	17.2
> 70	0.9	5.7	6.1	10.3
> 75	0.1	2.4	2.4	5.9
> 80	0.0	1.0	0.9	3.3

### U.S. Natural Gas

*(probabilities in percent; prices in U.S. dollars an MMBtu)*

Threshold Prices	Months Forward			
	3	6	9	12
< 1.50	0.0	0.5	1.6	1.6
< 2.00	1.3	4.9	9.1	10.5
< 2.50	9.5	17.4	24.8	36.7
< 3.00	31.3	41.2	47.7	68.7
< 3.50	70.8	69.6	69.7	87.3
> 4.00	6.9	12.1	15.7	5.3
> 4.50	1.6	4.2	7.9	2.4
> 5.00	0.4	1.5	4.1	1.1
> 5.50	0.1	0.6	2.1	0.5
> 6.00	0.0	0.2	1.1	0.3
> 6.5	0.0	0.1	0.6	0.1

### Gasoline

*(probabilities in percent; prices in U.S. dollars a gallon)*

Threshold Prices	Months Forward			
	3	6	9	12
< 0.75	0.0	0.2	0.7	
< 1.00	0.1	3.7	6.7	
< 1.25	3.7	19.2	25.0	
< 1.50	25.0	48.0	53.6	
< 1.75	60.7	75.5	77.6	
< 2.00	86.1	90.5	90.8	
> 2.25	3.6	3.3	3.5	
> 2.50	0.7	1.0	1.2	
> 2.75	0.1	0.3	0.4	
> 3.0	0.0	0.1	0.1	
> 3.0	0.0	0.0	0.0	

### Copper

*(probabilities in percent; prices in U.S. dollars a pound)*

Threshold Prices	Months Forward			
	3	6	9	12
< 1.50	0.0	0.0	0.6	1.7
< 1.75	0.0	0.9	3.9	6.6
< 2.00	0.8	6.0	13.1	16.6
< 2.25	7.8	19.4	28.9	31.9
< 2.50	37.6	43.7	49.5	51.5
< 2.75	81.6	72.8	70.2	70.5
> 3.00	3.4	9.9	15.0	16.1
> 3.25	0.6	3.5	7.1	8.5
> 3.50	0.1	1.2	3.2	4.5
> 4.00	0.0	0.1	0.6	1.2
> 4.5	0.0	0.0	0.1	0.3

### Gold

*(probabilities in percent; prices in U.S. dollars a troy ounce)*

Threshold Prices	Months Forward			
	3	6	9	12
< 800	0.0	0.0	0.3	0.6
< 900	0.0	0.3	1.5	2.2
< 1000	0.3	1.8	4.7	6.0
< 1100	1.9	6.7	12.2	14.5
< 1200	12.9	22.7	30.3	32.7
> 1300	41.5	42.0	42.0	41.9
> 1400	7.5	14.1	19.2	20.8
> 1500	1.5	4.6	8.1	9.4
> 1600	0.4	1.7	3.7	4.5
> 1700	0.1	0.6	1.8	2.3
> 1800	0.0	0.2	0.9	1.2

## Options-based Price Thresholds (concluded)

### Corn

*(probabilities in percent; prices in U.S. dollars a bushel)*

Threshold	Months Forward				
	Prices	3	6	9	12
< 2.0	0.0	0.0	0.2	0.3	
< 2.5	0.0	1.3	2.1	2.3	
< 3.0	0.2	8.7	9.5	11.1	
< 3.5	22.0	33.2	33.6	33.0	
> 4.0	13.9	27.3	31.7	38.8	
> 4.5	0.3	8.1	11.1	17.7	
> 5.0	0.0	2.6	4.1	7.1	
> 5.5	0.0	0.8	1.7	2.7	
> 6.0	0.0	0.2	0.7	1.1	
> 6.5	0.0	0.1	0.3	0.5	
> 7.0	0.0	0.0	0.1	0.2	

### Coffee

*(probabilities in percent; prices in U.S. dollars a pound)*

Threshold	Months Forward				
	Prices	3	6	9	12
< 0.6	0.0	0.0	0.1	0.1	
< 0.8	0.0	0.3	1.2	1.5	
< 1.0	0.2	3.8	6.1	7.6	
< 1.2	10.3	18.0	22.4	25.9	
> 1.4	45.0	45.3	45.6	46.4	
> 1.6	9.1	14.4	18.7	23.1	
> 1.8	0.8	4.4	6.7	10.1	
> 2.0	0.0	1.4	2.6	4.3	
> 2.2	0.0	0.4	1.2	1.9	
> 2.4	0.0	0.1	0.5	0.9	
> 2.6	0.0	0.0	0.2	0.5	

### Rough Rice

*(probabilities in percent; prices in U.S. dollars a hundredweight)*

Threshold	Months Forward				
	Prices	3	6	9	12
< 0.05	0.0	0.0	0.0	0.2	
< 0.06	0.0	0.2	0.3	1.3	
< 0.07	0.0	1.3	1.8	5.1	
< 0.08	0.8	4.8	6.0	13.3	
< 0.09	5.8	15.8	17.7	28.1	
> 0.10	64.1	59.0	59.0	51.0	
> 0.11	19.3	30.8	33.4	31.1	
> 0.12	5.0	13.7	16.4	17.4	
> 0.13	1.5	6.4	8.2	9.7	
> 0.14	0.4	3.2	4.3	5.5	
> 0.15	0.1	1.7	2.4	3.1	

### Wheat

*(probabilities in percent; prices in U.S. dollars a bushel)*

Threshold	Months Forward				
	Prices	3	6	9	12
< 2.5	0.0	0.1	0.3	0.3	
< 3.0	0.0	1.3	2.0	1.7	
< 3.5	2.7	6.3	6.9	6.0	
< 4.0	25.2	23.0	21.0	18.0	
> 4.5	32.6	43.0	51.1	58.9	
> 5.0	7.3	14.7	24.3	33.2	
> 5.5	0.9	3.8	9.6	15.8	
> 6.0	0.1	1.0	3.5	7.2	
> 6.5	0.0	0.3	1.2	3.5	
> 7.0	0.0	0.1	0.4	1.8	
> 7.5	0.0	0.0	0.1	1.0	

### Soybeans

*(probabilities in percent; prices in U.S. dollars a bushel)*

Threshold	Months Forward				
	Prices	3	6	9	12
< 5	0.0	0.0	0.1	0.3	
< 6	0.0	0.5	0.8	1.7	
< 7	0.1	3.6	3.9	6.0	
< 8	2.8	13.6	13.6	17.7	
< 9	22.6	40.1	39.9	42.7	
> 10	19.1	25.5	27.1	29.3	
> 11	2.8	8.6	9.4	12.2	
> 12	0.4	3.2	3.5	5.0	
> 13	0.0	1.1	1.5	2.3	
> 14	0.0	0.4	0.6	1.1	
> 15	0.0	0.1	0.2	0.6	

### Soybean Meal

*(probabilities in percent; prices in U.S. dollars a short ton)*

Threshold	Months Forward				
	Prices	3	6	9	12
< 150	0.0	0.0	0.0	0.1	
< 200	0.0	0.7	1.5	2.3	
< 250	0.6	7.2	9.9	12.1	
< 300	27.6	37.6	40.6	42.8	
> 350	15.3	17.0	19.3	20.4	
> 400	0.8	3.6	4.7	5.5	
> 450	0.0	0.9	1.4	1.7	
> 500	0.0	0.2	0.4	0.6	
> 550	0.0	0.0	0.1	0.2	
> 600	0.0	0.0	0.0	0.1	
> 650	0.0	0.0	0.0	0.0	

## Options-based Probabilities of Price Changes

(in percent)

### WTI Crude Oil

Price changes	Months Forward			
	3	6	9	12
-50%	0.0	0.2	0.8	0.5
-30%	0.3	5.2	9.8	11.8
-10%	18.6	28.7	36.6	43.9
+10%	17.9	24.2	26.0	25.2
+30%	1.0	4.4	7.0	8.8
+50%	0.0	0.9	1.9	2.6
+100%	0.0	0.0	0.1	0.1

### Brent Crude Oil

Price changes	Months Forward			
	3	6	9	12
-50%	0.0	0.0	0.0	0.3
-30%	0.0	2.3	1.6	9.2
-10%	10.0	24.6	27.2	40.0
+10%	18.2	27.3	26.6	27.0
+30%	0.6	4.7	5.0	9.1
+50%	0.0	0.7	0.6	2.6
+100%	0.0	0.0	0.0	0.1

### U.S. Natural Gas

Price changes	Months Forward			
	3	6	9	12
-50%	0.1	0.9	2.4	2.4
-30%	3.9	9.5	15.3	20.3
-10%	23.5	33.9	41.3	61.2
+10%	28.9	30.2	30.2	12.6
+30%	4.5	9.0	12.9	4.2
+50%	0.8	2.4	5.5	1.6
+100%	0.0	0.1	0.7	0.2

### Gasoline

Price changes	Months Forward			
	3	6	9	12
-50%	0.0	1.0	2.5	
-30%	2.6	16.5	22.0	
-10%	34.3	56.3	61.1	
+10%	20.5	13.3	12.6	
+30%	3.3	3.1	3.3	
+50%	0.3	0.6	0.7	
+100%	0.0	0.0	0.0	

### Copper

Price changes	Months Forward			
	3	6	9	12
-50%	0.0	0.0	0.0	0.3
-30%	0.0	1.2	4.7	7.6
-10%	10.4	22.6	32.0	34.9
+10%	13.3	22.6	26.3	26.4
+30%	0.4	2.8	5.9	7.3
+50%	0.0	0.3	1.2	2.0
+100%	0.0	0.0	0.0	0.1

### Gold

Price changes	Months Forward			
	3	6	9	12
-50%	0.0	0.0	0.0	0.0
-30%	0.0	0.2	1.3	2.0
-10%	4.5	12.0	19.2	21.8
+10%	7.2	13.6	18.8	20.4
+30%	0.2	0.9	2.4	3.0
+50%	0.0	0.0	0.4	0.6
+100%	0.0	0.0	0.0	0.0

## Options-based Probabilities of Price Changes (concluded)

(in percent)

### Corn

Price changes	Months Forward			
	3	6	9	12
-50%	0.0	0.0	0.1	0.1
-30%	0.0	1.9	2.8	3.1
-10%	6.6	21.3	22.5	23.7
+10%	9.8	23.7	28.2	35.7
+30%	0.0	4.1	6.0	10.4
+50%	0.0	0.8	1.6	2.5
+100%	0.0	0.0	0.1	0.1

### Coffee

Price changes	Months Forward			
	3	6	9	12
-50%	0.0	0.0	0.3	0.5
-30%	0.1	2.7	4.9	6.0
-10%	17.6	24.3	28.7	31.8
+10%	19.0	23.4	27.4	31.1
+30%	0.9	4.4	6.7	10.2
+50%	0.0	0.9	1.9	3.2
+100%	0.0	0.0	0.1	0.3

### Rough Rice

Price changes	Months Forward			
	3	6	9	12
-50%	0.0	0.0	0.0	0.2
-30%	0.1	1.6	2.1	5.9
-10%	8.0	19.0	20.8	31.2
+10%	14.5	26.4	29.3	27.8
+30%	1.1	5.4	7.0	8.5
+50%	0.1	1.4	2.0	2.6
+100%	0.0	0.0	0.1	0.1

### Wheat

Price changes	Months Forward			
	3	6	9	12
-50%	0.0	0.0	0.0	0.1
-30%	0.0	1.4	2.2	1.8
-10%	18.1	18.1	16.9	14.6
+10%	16.0	25.7	35.6	44.7
+30%	0.5	2.6	7.5	12.9
+50%	0.0	0.3	1.2	3.5
+100%	0.0	0.0	0.0	0.2

### Soybeans

Price changes	Months Forward			
	3	6	9	12
-50%	0.0	0.0	0.0	0.1
-30%	0.0	1.9	2.4	3.9
-10%	8.5	25.0	25.2	29.6
+10%	8.1	16.2	17.5	20.5
+30%	0.2	2.3	2.6	3.8
+50%	0.0	0.3	0.5	1.0
+100%	0.0	0.0	0.0	0.0

### Soybean Meal

Price changes	Months Forward			
	3	6	9	12
-50%	0.0	0.0	0.1	0.2
-30%	0.0	2.0	3.5	4.7
-10%	10.4	21.5	25.5	28.4
+10%	20.0	20.6	22.7	23.7
+30%	0.5	3.0	3.9	4.7
+50%	0.0	0.5	0.9	1.2
+100%	0.0	0.0	0.0	0.0

## Commodity Derivative Contract Specifications

Commodity	Exchange	Contract	Physical Characteristics	Contract Size	Pricing Unit	Months Traded
<b>Brent crude oil</b>	ICE Europe	Futures	Light sweet crude oil	1,000 barrels	U.S. dollars per barrel	Consecutive months up to and including February 2020
		Options		One crude oil futures contract of 1,000 barrels		
<b>WTI crude oil</b>	New York Mercantile Exchange	Futures	Light sweet crude oil	1,000 barrels	U.S. dollars per barrel	Consecutive months are listed for the current year and the next five years; in addition, the Jun and Dec contract months are listed beyond the sixth year.
		Options		One crude oil futures contract of 1,000 barrels		
<b>Natural Gas</b>	New York Mercantile Exchange	Futures	Natural gas delivered at Henry Hub, LA	10,000 MMBtu	U.S. dollars per MMBtu	Consecutive months for the current year plus the next twelve full calendar years.
		Options		One natural gas futures contract of 10,000 MMBtu		
<b>Gasoline</b>	New York Mercantile Exchange	Futures	New York Harbor RBOB	42,000 gallons	U.S. cents per gallon	Consecutive months for 36 months
		Options		One gasoline futures contract of 42,000 gallons		
<b>Gold</b>	Chicago Mercantile Exchange	Futures	Gold (a minimum of 995 fineness)	100 troy ounces	U.S. dollars per troy ounce	Current calendar month; the next two calendar months; any Feb, Apr, Aug, and Oct falling within a 23-month period; and any Jun and Dec falling within a 72-month period beginning with the current month.
		Options		One COMEX Gold futures contract		
<b>Corn</b>	Chicago Mercantile Exchange	Futures	Yellow corn grade #2	5,000 bushels (127 MT)	U.S. cents per bushel	Mar, May, Jul, Sep, Dec. The monthly option contract exercises into the nearby futures contract.
		Options		One corn futures contract (of a specified month) of 5,000 bushels		
<b>Coffee</b>	ICE	Futures	Arabica coffee from 19 countries of origin	37,500 lbs	U.S. cents per pound	Mar, May, Jul, Sep, Dec. The monthly option contract exercises into the nearby futures contract.
		Options		One coffee futures contract (of a specified month) of 37,500 lbs		
<b>Rough rice</b>	Chicago Mercantile Exchange	Futures	U.S. #2 long grain rough rice with a total milling yield of 65%+	2,000 hundredweights (CWT)	U.S. cents per hundredweight	Jan, Mar, May, Jul, Sep, Nov. The monthly option contract exercises into the nearby futures contract.
		Options		One rough rice futures contract of 2,000 hundredweights (CWT)		
<b>Wheat</b>	Chicago Mercantile Exchange	Futures	#2 soft red winter wheat	5,000 bushels (136 MT)	U.S. cents per bushel	Mar, May, July, Sep, Dec. The monthly option contract exercises into the nearby futures contract.
		Options		One Wheat futures contract (of a specified month) of 5,000 bushels		
<b>Soybean meal</b>	Chicago Mercantile Exchange	Futures	Meal with minimum protein of 48%	100 short tons	U.S. dollars per ton	Jan, Mar, May, Jul, Aug, Sep, Oct, Dec. The monthly option contract exercises into the nearby futures contract.
		Options		One soybean meal futures contract (of a specified month) of 100 short tons		
<b>Soybeans</b>	Chicago Mercantile Exchange	Futures	Yellow soybean grade #2	5,000 bushels (136 MT)	U.S. cents per bushel	Jan, Mar, May, Jul, Aug, Sep, Nov. The monthly option contract exercises into the nearby futures contract.
		Options		One soybean futures contract (of a specified month) of 5,000 bushels		

Sources: Chicago Board of Trade, ICE, Bloomberg, L.P.



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